

Amendments to the Claims

This listing of claims will replace all prior versions of claims in the application.

Listing of claims:

Claims 1 - 9 (canceled)

10.(previously amended): A method for positioning a rudder of a ship wherein the rudder is driven by a rudder drive system in accordance with a rudder error determined by the difference between a rudder position and a rudder order, the rudder drive system including a solenoid energized at a set rudder error, said solenoid coupled to an hydraulic pump which is activated when said solenoid is energized, comprising the steps of:

establishing an energizing frequency for solenoid burnout protection thereby providing a burnout protection frequency;

monitoring solenoid energizing frequency:

determining when said solenoid is being energized at an energizing frequency that exceeds said burnout protection frequency; and

adjusting said set rudder error to a second set rudder error when said energizing frequency exceeds said burnout protection frequency.

11.(previously amended) A method in accordance with claim 10 wherein said second set rudder error is increased in said adjusting step.

12.(previously amended) A method in accordance with claim 10 wherein solenoid energizations are monitored to determine said energizing frequency in said determining step.

13.(previously presented) A method in accordance with claim 10 wherein hydraulic pump activations are monitored to determine said energizing frequency in said determining step.

Claims 14 - 16 (canceled)

17.(presently amended) A rudder positioning apparatus for a ship including an hydraulic system having [a] solenoids energized at a set rudder position error, to activate pumps, of the hydraulic system, the a rudder position ~~errors~~ error being determined by the difference between a rudder position and a rudder order, comprising:

a frequency detector coupled to said hydraulic system to determine frequency of said hydraulic system turn on, and

a solenoid turn on adjuster coupled to said solenoid of said hydraulic system and said frequency detector for adjusting said set rudder position error when said frequency detector indicates that a predetermined frequency of solenoid energizations has been exceeded.

18.(previously amended) A rudder positioning apparatus in accordance with claim 17 wherein said frequency detector monitors activations of at least one solenoid in said hydraulic system.

19.(previously amended) A rudder positioning apparatus in accordance with claim 17 wherein said frequency detector monitors turn-ons of at least one pump in said hydraulic system.

20.(previously amended) A rudder positioning apparatus in accordance with claim 17 wherein said rudder position is provided by a rudder repeatback signal and further including a repeatback signal rate of change detector for monitoring operation of said rudder drive system.

21.(currently amended) A method for positioning a rudder of a ship in accordance with claim 10 further comprising the steps of:

determining a difference between a ~~desired rudder stop position~~ order and a rudder stop position after said rudder drive system is turned off ~~has achieved a turnoff point in response to said rudder order, thereby establishing a rudder position stopping error;~~

comparing said rudder position stopping error to a predetermined rudder position tolerance; and

~~comparing said rudder stop position to said desired rudder stop position to establish a rudder stop error; and~~

~~determining a stop position for said rudder in accordance with said rudder stop error such that said rudder stop position does not exceed a predetermined position tolerance.~~

utilizing said rudder position stopping error, should said rudder position exceed said rudder position tolerance, to determine a corrected turnoff point for said rudder drive system such that said rudder stops at a position within said predetermined rudder position tolerance.

22.(currently amended) A method for positioning a rudder of a ship in accordance with claim 21 wherein said ~~determining~~ utilizing step includes the steps of:

decreasing said ~~stop~~ turnoff point ~~position~~ when said rudder ~~stop position stopping error~~ indicates that said rudder has stopped short of said ~~desired rudder stop order~~ position; and

increasing said ~~stop~~ turnoff point ~~position~~ when said rudder ~~stop position stopping error~~ indicates that said rudder has stopped at a position that exceeds said ~~desired rudder stop order~~ position.

23.(currently amended) A method for positioning a rudder of a ship in accordance with claim 22 wherein said decreasing step includes the steps of:

subtracting said rudder ~~stop position stopping~~ error from said rudder stop position to provide an adjusted rudder ~~drive-system~~ turnoff point; and

resetting said rudder ~~stop-position~~ turnoff point to said adjusted rudder ~~drive-system~~ turnoff point.

24.(currently amended) A method for positioning a rudder of a ship in accordance with claim 22 wherein said increasing step includes the steps of:

adding said rudder ~~stop position stopping~~ error to said rudder ~~stop~~ turnoff position to provide an adjusted rudder turnoff point; and

resetting said rudder ~~stop-position~~ turnoff point to said adjusted rudder ~~drive-system~~ turnoff point.

25.(currently amended) A rudder positioning apparatus in accordance with claim 17 further including:

a rudder drive system that ~~positions rudders in accordance with~~ turns off at a turnoff point in response to a rudder order; ~~stop-position error determined by differences between a selected rudder position and a rudder stop position achieved after said rudder drive system turnoff~~

a rudder error detector that determines a difference between a rudder stop position, achieved after said turnoff point is reached, and said rudder order, thereby establishing a rudder stop position error; and

a rudder position turnoff adjuster coupled to said rudder drive system and said rudder error detector for resetting said turnoff point in accordance with said rudder stop position error, thereby providing an adjusted turnoff point.

26.(currently amended) A rudder positioning apparatus in accordance with claim 25 wherein said rudder position turnoff adjuster resets said turnoff point by decreasing said turnoff point when said rudder stop position error indicates that an undershoot of said rudder order turnoff has occurred and increasing said turnoff point when said rudder stop position error indicates that an overshoot of said rudder order turnoff has occurred.

27.(cancelled